

CLAIMS

What is claimed is:

1 1. A multiple fan monitoring circuit for use with
2 a plurality of fans, wherein each of said plurality of
3 fans operates at a different frequency and generates a
4 tach signal indicative of said fan operation, comprising:

5 a plurality of waveform shaping networks, wherein
6 each of said plurality of waveform shaping networks is
7 coupled to a corresponding one of said plurality of fans
8 and utilized to waveshape a tach signal generated by said
9 corresponding fan; and

10 a frequency processing circuit, coupled to said
11 plurality of waveform shaping networks, that receives
12 said waveshaped tach signals at a fan sense node.

1 2. The multiple fan monitoring circuit as recited
2 in Claim 1, wherein said frequency processing circuit
3 includes:

4 a summing circuit, coupled to said fan sense node,
5 that combines said waveshaped tach signals into a single
6 combined signal; and

7 a frequency discriminator, coupled to said summing
8 circuit, that separates said single combined signal into
9 multiple components, wherein each of said multiple
10 components corresponds to a particular fan in said
11 plurality of fans.

1 3. The multiple fan monitoring circuit as recited
2 in Claim 2, wherein said frequency processing circuit
3 further comprises an analog to digital converter.

1 4. The multiple fan monitoring circuit as recited
2 in Claim 2, wherein said summing circuit includes a
3 operational amplifier (op-amp) configured as a summer.

1 5. The multiple fan monitoring circuit as recited
2 in Claim 1, wherein each of said plurality of waveform
3 shaping circuits includes a resistor and a capacitor.

1 6. The multiple fan monitoring circuit as recited
2 in Claim 2, wherein said frequency discriminator utilizes
3 a fast fourier transform (FFT) process to separate said
4 single combined signal into multiple components.

1 7. The multiple fan monitoring circuit as recited
2 in Claim 1, wherein each of said plurality waveform
3 shaping networks includes a blocking capacitor.

1 8. A method for monitoring a plurality of fans
2 utilizing a single sense node, wherein each of said
3 plurality of fans operates at a different frequency and
4 generates a tach signal indicative of said fan operation,
5 said method comprising:

6 waveshaping each of said tach signals generated by
7 said plurality of fans;

8 combining said waveshaped tach signals at said
9 single sense node into a single combined signal; and

10 separating said single combined signal into multiple
11 components, wherein each of said multiple components
12 corresponds to an associated fan in said plurality of
13 fans.

1 9. The method as recited in Claim 8, wherein said
2 waveshaping each of said tach signals includes utilizing
3 a plurality of waveform shaping networks, wherein each of
4 said plurality of wave form shaping networks includes a
5 resistor and a capacitor.

1 10. The method as recited in Claim 8, further
2 comprising converting said single combined signal into a
3 digital form.

1 11. The method as recited in Claim 8, wherein said
2 combining said waveshaped tach signals includes utilizing
3 a operational amplifier configured as a summer.

1 12. The method as recited in Claim 8, wherein said
2 separating said single combined signal includes
3 performing a fast fourier transform (FFT) operation on
4 said single combined signal.

Run	Δt (s)	Δx (m)	Δy (m)	Δz (m)	Δt (s)	Δx (m)	Δy (m)	Δz (m)
1	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
2	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
3	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
4	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004
5	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
6	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
7	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007
8	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008
9	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009
10	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
11	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011
12	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012
13	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013
14	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014
15	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
16	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016
17	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
18	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
19	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019
20	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
21	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021
22	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022
23	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023
24	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024
25	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025
26	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026
27	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027
28	0.028	0.028	0.028	0.028	0.028	0.028	0.028	0.028
29	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.029
30	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030
31	0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.031
32	0.032	0.032	0.032	0.032	0.032	0.032	0.032	0.032
33	0.033	0.033	0.033	0.033	0.033	0.033	0.033	0.033
34	0.034	0.034	0.034	0.034	0.034	0.034	0.034	0.034
35	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
36	0.036	0.036	0.036	0.036	0.036	0.036	0.036	0.036
37	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.037
38	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038
39	0.039	0.039	0.039</					

1 14. A data processing system, comprising:
2 a processor having at least one fan sense node;
3 a plurality of fans, wherein each of said plurality
4 of fans operates at a different frequency and generates a
5 tach signal indicative of said fan operation; and
6 a multiple fan monitoring circuit, coupled to said
7 plurality of fans, including:

8 a plurality of waveform shaping networks,
9 wherein each of said plurality of waveform shaping
10 networks is coupled to a corresponding one of said
11 plurality of fans and utilized to waveshape a tach
12 signal generated by said corresponding fan; and

13 a frequency processing circuit, coupled to said
14 plurality of waveform shaping networks, that
15 receives said waveshaped tach signals at a fan sense
16 node.

1 15. The data processing system as recited in Claim
2 14, wherein said frequency processing circuit includes:

3 a summing circuit, coupled to said fan sense node,
4 that combines said waveshaped tach signals into a single
5 combined signal; and

6 a frequency discriminator, coupled to said summing
7 circuit, that separates said single combined signal into
8 multiple components, wherein each of said multiple
9 components corresponds to a particular fan in said
10 plurality of fans.

1 16. The data processing system as recited in Claim
2 15, wherein said frequency processing circuit further
3 comprises an analog to digital converter.

1 17. The data processing system as recited in Claim
2 15, wherein said summing circuit includes a operational
3 amplifier (op-amp) configured as a summer.

1 18. The data processing system as recited in Claim
2 14, wherein each of said plurality of waveform shaping
3 circuits includes a resistor and a capacitor.

1 19. The data processing system as recited in Claim
2 15, wherein said frequency discriminator utilizes a fast
3 fourier transform (FFT) process to separate said single
4 combined signal into multiple components.

1 20. The data processing system as recited in Claim
2 14, wherein each of said plurality waveform shaping
3 networks includes a blocking capacitor.